

Low Power 2-Bit ADC Array with Serial Output, Phase II

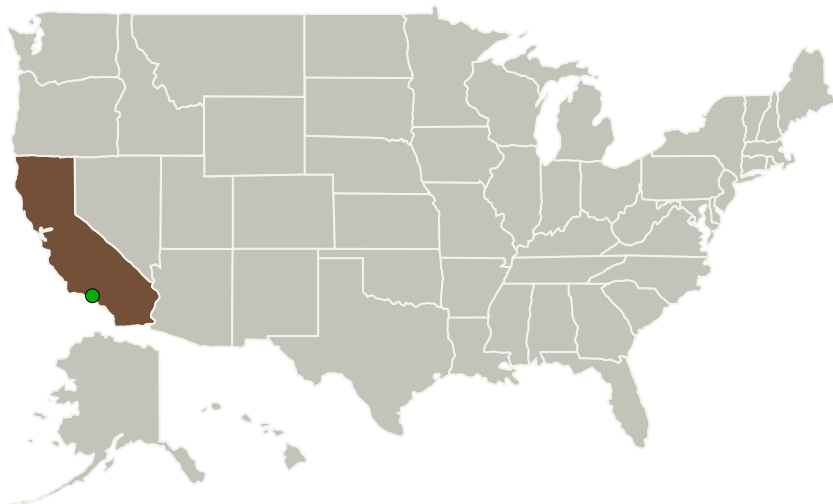
Completed Technology Project (2011 - 2013)



Project Introduction

Microwave interferometers for NASA missions such as PATH employ the GeoSTAR instrument, consisting of 600 receivers. Each receiver requires I and Q ADCs (analog-to-digital converters) for signal digitizing at 1GHz before further processing in the cross-correlators. Power consumption as well as instrument volume and weight are critical in space born instruments. During Phase I, Pacific Microchip Corp. designed the block diagrams and circuits of a monolithic array consisting of sixteen 2-bit ADCs. A serializer is integrated to reduce the number of outputs from 32 to 1. This reduces the power consumption per ADC and resolves the problem of wiring congestion in the interface with cross-correlators. For further power reduction, a novel metastability programming feature is integrated into the ADC latches. The clock distribution is fundamentally simplified as well. The 2-wire serial I2C (Inter-Integrated Circuit) interface allows all 1200 ADCs of the GeoSTAR instrument to be calibrated and optimized. Phase I work provided a complete definition and in silico validation of the monolithic ADC array with serial output. Phase II of the project will produce a fieldable product. In order to facilitate the commercialization efforts in Phase III, a Complementary Metal-Oxide-Semiconductor (CMOS) Silicon-on-Isolator (SOI) technology will be used for fabrication.

Primary U.S. Work Locations and Key Partners



Low Power 2-Bit ADC Array with Serial Output, Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Low Power 2-Bit ADC Array with Serial Output, Phase II

Completed Technology Project (2011 - 2013)



Organizations Performing Work	Role	Type	Location
Pacific Microchip Corporation	Lead Organization	Industry	Culver City, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

**June 2011:** Project Start**September 2013:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139178>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Pacific Microchip Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

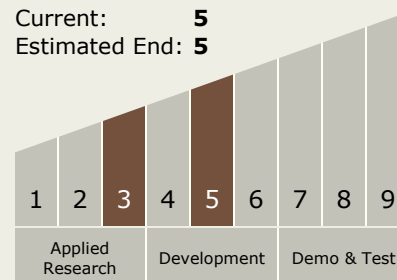
Carlos Torrez

Principal Investigator:

Dalius Baranauskas

Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



Low Power 2-Bit ADC Array with Serial Output, Phase II

Completed Technology Project (2011 - 2013)



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System